

**COMMONWEALTH OF VIRGINIA**  
**DEPARTMENT OF ENVIRONMENTAL QUALITY**

**SUBJECT:** Waste Guidance Memorandum No. XX-2006  
Water Guidance Memorandum No. 06-XXX

**Surface Water Impacts at Solid Waste Landfills**

**TO:** Regional Directors

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An electronic copy of this document is available for staff internally on the DEQnet, and for the public on DEQ's website at <http://www.deq.virginia.gov/waterguidance/permits.html>.

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**This document is provided as guidance and, as such, sets forth standard operating procedures for the agency. It does not mandate any particular method nor does it prohibit any particular method for the analysis of data, establishment of a Waste load allocation, or establishment of a permit limit. If alternative proposals are made, such proposals should be reviewed and accepted or denied based on their technical adequacy and compliance with appropriate laws and regulations.**

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**EXECUTIVE SUMMARY**

The Department of Environmental Quality (DEQ) administers and implements the Solid Waste Act and State Water Control Law. Each contains provisions regulating the discharge of leachate or other pollutants into state waters. Both the Waste and Water permitting programs have the authority to resolve apparent violations caused by landfill-derived discharges to surface water or groundwater.

Consistent with Va. Code **10.1 – 1425.19** which requires intra-program coordination during multimedia inspections, and Va. Code **10.1 – 1402(9)** which requires the Waste Board to

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coordinate with other government entities to achieve maximum effectiveness while imposing the least burden of duplicate regulatory requirements, this memorandum aims to address and clarify the responsibilities of the Solid Waste and Water Permitting programs regarding landfill inspections, inspection reporting responsibilities, and resolution of surface water non-compliance issues. Close coordination between each Department program is critical to ensure effective resolution of surface water impacts from landfills.

This guidance is based on the requirements of **9 VAC 20-80-10** et seq., **9 VAC 25-31-10** et seq., and **9 VAC 25-260-05** et seq., and sets forth the following goals:

1. Consistent with EPA's Corrective Action Program guidance, there should be no cross media transfer of landfill-derived contaminants from groundwater to surface water unless such transfer is a result of a site specific remediation system, and the discharge is governed by a discharge permit with site-specific restrictions.
2. Consistent with **9 VAC 20-80-10**, leachate impacted groundwater is regulated as contaminated groundwater, and remediation (**9 VAC 20-80-310**) of contaminated groundwater must achieve site specific groundwater protection standards, as well as any applicable surface water standards which may be more strict than groundwater protection standards.
3. Consistent with policy established by a July 15, 1988 State Water Control Board Memorandum, VPDES permits should not be issued to a landfill owner/operator for a discharge of untreated, leachate-impacted groundwater unless all other remedies under the solid waste regulations have been exhausted, or the discharge is required as part of an on-site groundwater treatment system operation. If a VPDES permit is issued, it should contain those conditions required by the water regulations, as well as those conditions which may be considered necessary by the Waste Compliance Manager to address provisions in the solid waste regulations, or which may be required by the Groundwater Manager as part of groundwater corrective action required under **9 VAC 20-80-310.C**.
4. Approval shall not be granted to any groundwater Corrective Action Plan (CAP) based on a remedy (including a presumptive remedy) which can not be demonstrated to meet the substantive requirements of **9 VAC 25-26-20** (all state waters shall be free from substances attributable to sewage or other waste in concentrations, amounts, or combinations which contravene established standards or which are inimical or harmful to human, animal, plant, or aquatic life, or which nourish undesirable or nuisance aquatic plant life).

### **LIMITATIONS**

This guidance covers releases from all types of landfill sites (including lined or unlined, active or closed, permitted, unpermitted, or of open dump characteristics) other than transfer stations, or landfills which have a release or surface water impact originating solely from a leachate collection/treatment system currently operating under a VPDES permit.

This guidance is applicable only to surface water impacts derived from unpermitted discharges. Impacts derived from unauthorized discharges (discharges in excess to that specified under an existing VPDES permit), or derived from problems associated with storm water management, shall be addressed by the Water permitting program under existing policy and guidance.

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This guidance augments existing **Water guidance 00-2010** which deals with addressing unpermitted discharges. Undertaking any actions under this new guidance to mitigate a surface water impact using the authorities granted under the solid waste management regulations (**9 VAC 20-80-10**) shall not supersede or replace any of the permitting or compliance authorities granted to the Water program.

This guidance uses the surface water feature definitions “permanent, intermittent, and ephemeral” as defined under **Water guidance 91-002**. This guidance adopts the related ‘compliance points’ for the purposes of dealing with impacted groundwater during the groundwater corrective action process.

This guidance uses the definition of “leachate” found under **40 CFR 257 and 258, EPA 175-B-97-001, and 9 VAC 20-80-10**, and the definition of “discharge” found under **9 VAC 25-31-10**.

The definition of “free” under **9 VAC 25-26-20** (all state waters be free from substances attributable to sewage, industrial waste, or other waste in concentrations, amounts, or combinations which contravene established standards or which are inimical or harmful to human, animal, plant, or aquatic life, or which nourish undesirable or nuisance aquatic plants) is herein, for the purposes of interpreting analytical sampling results, established to mean constituent levels which are below the laboratory limit of detection (LOD) – the lowest concentration of a constituent which can be recognized by the analytical test as being present with 99% chance of certainty.

### BACKGROUND

A landfill, during its active life, or post-closure period, may impact surface water as a result of leachate releases directly to surface water via overland flow or indirectly via the migration of contaminated groundwater toward surface water. When dealing with the problem of addressing such impact, the Water Control Board ceded primary authority for addressing surface water impacts at landfills in 1988 to the Department of Waste Management. The 1988 Water Control Board guidance noted that:

*“The State Water Control Board will provide assistance as requested to the Department of Waste Management”.*

The 1988 Guidance further stated that in the case of point source discharge Permit applications:

*“The Department of Waste Management will have exhausted all other possible remedies before deferring the matter to the Water Control Board for issuance of a Permit”.*

Water Guidance 00-2010, issued in 2000, further established that:

*“Upon identification and documentation of an unpermitted discharge, the facility owner or operator must be formally notified. In cases where environmental harm has occurred or the discharge is a repeat violation, initial notification may be in the form of a Notice of Violation.”*

*“The notification should inform the facility owner or operator ... that action needs to be taken to bring the facility into compliance”.*

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This guidance builds upon these earlier policies and defines that in most instance at landfills, the mitigation of the surface water impacts should proceed as part of groundwater corrective actions conducted as part of **9 VAC 20-80-310**, or under the operations provisions (**20-80-250.C; 260.C; 270.C**), or closure provisions (**20-80-250.E; 260.E; 270.E**) of the VSWMR.

Even though mitigative actions may proceed under the VSWMR, close coordination with the Water program is required to remain consistent with provision/policies in existing Water guidance, as well as to ensure full protection of human health and the environment.

### **RECOGNITION OF SURFACE WATER IMPACTS AT LANDFILLS**

During inspections of permitted landfills, or response to complaints, solid waste inspectors make visual observations of the site conditions, review landfill records, and interview site personnel in a process designed to establish compliance with solid waste management regulations. It is not expected that solid waste inspectors make definitive calls regarding surface water impacts but they are responsible for recognizing conditions which may indicate a surface water impact on site. With respect to biological impacts, several naturally-occurring bacterial strains may be found in surface water throughout the Commonwealth, and such growths do not automatically suggest pollutant discharge into state waters. However, when such conditions are found in proximity to a solid waste landfill, the solid waste inspector must determine if it is likely that the surface water condition present is related to a condition originating from the landfill. During the course of the field inspection, the solid waste inspector should:

- Determine whether any surface water bodies are present on site.
- Attempt to discern the character of the surface water body in question (permanent), (intermittent), or (ephemeral).
- Visually examine all surface water bodies for evidence of potential landfill impact such as: 1) damage from blowing trash or excessive sedimentation, 2) damage resulting from abnormal or unusual growth of bacterial mats [commonly orange, grey, or black in color; and bulbous, spongy, or filamentous in form], or 3) damage from chemical discharge.
- In the case of number 2 above, the inspector should determine whether the impacts are restricted to surface water topographically downgradient of the waste mass by comparing the conditions to upgradient surface water bodies (if possible).
- When abnormal bacterial growth is recognized, the solid waste inspector should document the condition via photos and should note the color, description, and length of the 'impacted' zone. If floating bacterial films ('rainbow' sheens) are recognized, these should be noted as well.
- When chemical discharge is suspected, the inspector should note any descriptive field characteristics including unusual water coloring, noxious odors, or dead aquatic life.
- The inspector should attempt to trace backward to the originating point of the surface water impact. Special attention should be paid to whether the condition originates in a surface seep, or along a diffuse zone along the bottom of the channel.
- Landfill personnel should be questioned as to how often this condition is present on site, or whether it has been recognized in the past.

### **ADDRESSING SURFACE WATER IMPACTS AT LANDFILLS**

After the field inspection, the solid waste inspector should discuss the field visit findings with the Regional Waste Compliance Manager and the Groundwater Manager or Coordinator. Based on

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the condition of the surface water body, its location with respect to the landfill, and proximity to the facility boundary, a number of potential actions should be considered:

- Water program staff should be shown any field photographs showing the extent of the surface water impact. The presence of any suspected surface water impact on site should be recorded in writing for the permanent file.
- Concerning potential biologic impairment, request the Regional Biologist perform a benthic survey to document the extent and severity of biologic impairment. If the Regional Biologist determines that such a survey is not appropriate (in cases like small headwater streams) other contingency actions (such as periphyton index screening) will be considered.
- Concerning chemical impairment (if discharge from seeps is observed draining into the surface water body), request that Regional water quality staff perform sampling of the surface water body to document an unpermitted discharge. Samples should be taken at the suspected point of discharge, and at the downstream property boundary.
- Consider requesting the Permittee undertake sampling of the surface water body for leachate indicator parameters or the solid waste Table 5.5 constituent list at the locations listed above.

The goal of the above actions is to collect information sufficient to evaluate compliance with either solid waste or water regulations.

### **ADDRESSING SURFACE WATER COMPLIANCE ISSUES AT LANDFILLS**

Based on the results of the benthic survey, and/or water quality sampling, the following restrictions should be considered. Title **62.1 – 44.5** of the State Water Law prohibits the discharge or other quality alterations of state waters except as authorized by Permit. Virginia's Water Regulations also contain a number of restrictions regarding surface water quality which would be applicable at landfill sites.

- **9 VAC 25-26-20** requires all State Waters be free from waste substances in concentrations or combinations which contravene established standards or which are inimical or harmful to human, animal, plant, or aquatic life, or which nourish undesirable or nuisance aquatic plant life.
- **9 VAC 25-26-140** requires that in-stream water quality not be acutely or chronically toxic except as allowed in mixing zones.
- **9 VAC 25-31-50** prohibits discharge into State Waters or the alteration of the physical, chemical or biological properties of State Waters making them detrimental to public health, animal, or aquatic life, unless in compliance with a VPDES Permit.
- **9 VAC 25-32-30** prohibits the discharge into State Waters or the alteration of the physical, chemical or biological properties of State Waters making them detrimental to public health, animal or aquatic life, unless in compliance with a VPA Permit.

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Surface water quality restrictions under the Solid Waste regulations for *operating* landfills may be found under:

- **9 VAC 20-80-250.C.10**, which prohibits solid waste from being deposited in, or being permitted to enter any surface waters or groundwaters.
- **9 VAC 20-80-250.C.12.a**, which prohibits the discharge of pollutants into waters of the United States that violates any requirements of the Clean Water Act, including VPDES requirements and Virginia Water Quality Standards.
- **9 VAC 20-80-250.C.12.b**, which prohibits the discharge of non-point source pollution to waters of the United States that violates any requirements of an area-wide or state-wide water quality management plan that has been approved under section 208 or 319 of the Clean Water Act, or Virginia Water Quality Standards.
- **9 VAC 20-80-260.C.14**, which prohibits the draining or discharge of leachate into surface waters except as authorized by a VPDES Permit.
- **9 VAC 20-80-270.C.19**, which prohibits the draining or discharge of leachate into surface waters except as authorized by a VPDES Permit.

Restrictions for *closed* landfills may be found under:

- **9 VAC 20-80-250.E.1.a**; **9 VAC 20-80-260.E.1.a**; and **9 VAC 20-80-270.E.1.a**; each of which require a landfill to be closed in a manner that controls, minimizes, or eliminates, to the extent necessary to protect human health and the environment, the post-closure escape of uncontrolled leachate, surface runoff, or waste decomposition products to ... surface water.

Restrictions for *unpermitted* landfills may be found under:

- **9 VAC 20-80-180.B.3** which prohibits an unpermitted landfill from causing a discharge into State Waters in violation of VPDES or VPA requirements.

In many cases, the language of the solid waste regulations cross-references one or more conditions related to restrictions described under the water regulations. Consistent with the 1988 Water Control Board memorandum, addressing the non-compliance issue will initially proceed under the direction of the Waste program. However, coordination with Water program staff is crucial to developing a compliance case. The purpose during the field inspection, and survey/sample collection efforts is the obtain documentation of non-conformance with one or more of the regulatory provisions noted above. Water program staff have expertise in stream surveys and water quality sampling; their assistance will often be crucial in building a compliance case.

Once an issue of apparent surface water non-conformance has been recognized and documented, the following should take place:

- In the case of impacts from unpermitted point source discharges such as seeps and springs, consistent with the procedure established under Water guidance 00-2010, Regional water program staff shall notify the Permittee of the non-compliance issue, after receiving a formal referral from the Regional Waste Compliance Manager. If the discharge also results from

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non-conformance with one or more provisions of the solid waste regulations, the notification may be released jointly by Water and Waste staff. When the discharge results solely from actions at the landfill, the notification will refer the Permittee to the solid waste program for further action regarding the issue of non-compliance. For sites in groundwater corrective action, mitigation will take place at the same time the groundwater is addressed. For sites not in groundwater corrective action, mitigation may be required through changes in the facility's operations plan and or Permit.

- In the case of impacts from non-point source discharges originating from contaminated groundwater, regional Waste program staff shall notify the Permittee of the non-compliance issue. If the discharge effects stem from improper site closure or leachate handling practices, the notification will refer the Permittee to Regional Waste Compliance Manager for further action. In cases where the discharge effects stem from the interaction of contaminated groundwater and surface water, the notification will direct the Permittee to the Groundwater Manager in Central Office for further action under the groundwater corrective action program. Landfills which impact surface water, but are not yet in the groundwater corrective action program may be required to mitigate the impact under another compliance mechanism such as an Order, Letter of Agreement, or Permit amendment.

### **ADDRESSING SURFACE WATER IMPACTS UNDER THE VPDES PROGRAM**

In cases where a point source discharge has been identified at a landfill which has exceeded one or more of its groundwater protection standards, as allowable under the water permitting regulations, and water guidance 00-2010, a VPDES permit may be issued for a discharge related to a groundwater extraction system, but it shall not contain conditions or discharge allowances which would conflict or otherwise restrict the ability of the Waste program to enforce the closure provisions under **9 VAC 20-80-250.E.1.a**; **9 VAC 20-80-260.E.1.a**; **9 VAC 20-80-270.E.1.a**, or corrective action provisions under **9 VAC 20-80-310.B.2** and **9 VAC 20-80-310.C.1.c.**, to the extent allowable under the federal Clean Water Act and State Water Control Law.

By definition (**9 VAC 20-80-10**) landfill leachate which has contaminated groundwater is regulated as contaminated groundwater. Clean-up standards of **9 VAC 20-80-310** shall apply at the discharge point for the treated groundwater (i.e. prior to treated groundwater entering surface water). If the Permittee applies for a VPDES permit, the permit application and proposed discharge limits shall be forwarded to the regional Waste Compliance Manager and the Groundwater program manager for review and comment prior to permit issuance.

### **ADDRESSING SURFACE WATER IMPACTS UNDER THE SOLID WASTE PERMITTING PROGRAM**

In cases where the surface water discharge results from any non-conformance with landfill operational or closure requirements in the solid waste regulations, mitigation will proceed under the direction of the Regional Solid Waste permit writer and Waste Compliance Manager (actions which may necessitate an Order, or amendment to the existing solid waste permit).

### **ADDRESSING SURFACE WATER IMPACTS UNDER GROUNDWATER CORRECTIVE ACTION**

When groundwater on site has been documented to be impacted at levels which exceed one or more groundwater protection standard, **9 VAC 20-80-310.B.2** requires a Permittee to develop a Corrective Action Plan that can be shown to be able to achieve groundwater protection standards,

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be protective of human health and the environment (including surface water), control the source of the release, and properly manage any derived wastes. A surface water monitoring component will be required as part of the site-wide corrective action.

**9 VAC 20-80-310.C.1.c** allows interim measures to be undertaken if there is evidence of an actual or potential exposure of nearby environmental receptors, sensitive ecosystems, or drinking water supplies. In cases where a discharge to surface water is identified, interim measures will be required of the Permittee to ensure the discharge is not allowed to continue unmitigated during the process of developing a corrective action plan.

In cases where a plume of contaminated groundwater is documented to intersect with surface water on site, it shall be the Groundwater Manager's responsibility to ensure no groundwater Corrective Action Plan be approved which includes a remedy (including Presumptive Remedies) which can not be shown to have the ability to meet the requirements under **9 VAC 20-80-310.B** or the requirements of **9 VAC 25-26-20** which notes that all state waters be free from substances attributable to sewage, industrial waste, or other waste in concentrations, amounts, or combinations which contravene established standards or which are inimical or harmful to human, animal, plant, or aquatic life, or which nourish undesirable or nuisance aquatic plant. This provision shall apply even in those cases where the surface water body may already be impacted by other sources, since allowing additional landfill-derived impacts to surface water may impair mitigative actions which may be required of other impacting sources under the State's TMDL program. Mitigation of the landfill-derived discharge to surface water may require site-specific remedial actions such as groundwater flow controls (extraction wells), installation of permeable reactive barriers, or through injection of bioremediation enhancing compounds or oxygen/hydrogen releasing compounds to degrade the plume front before it hits surface water.

## **CONCLUSIONS**

- Consistent with EPA guidance, there should be no cross media transfer of landfill-derived contaminants from groundwater to surface water unless such transfer is a result of a site specific remediation system, and the discharge is governed by permit.
- Contaminated groundwater, and remediation of contaminated groundwater must achieve site specific groundwater protection standards, as well as any applicable surface water standards which may be more strict than groundwater protection standards.
- VPDES permits should not be issued to a landfill for a discharge of untreated, leachate-impacted groundwater unless all other remedies under the solid waste regulations have been exhausted, or the discharge is required as part of an on-site groundwater treatment system operation and such permit contains conditions required by the water regulations, as well as those conditions required by the Waste Compliance and Groundwater Manager.
- Approval shall not be granted to any groundwater Corrective Action Plan (CAP) based on a remedy (including a presumptive remedy) which can not be demonstrate that onsite surface waters will be free from substances attributable to sewage or other waste in concentrations, amounts, or combinations which contravene established standards or which are inimical or harmful to human, animal, plant, or aquatic life, or which nourish undesirable or nuisance aquatic plant life.